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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

**Appl. No.** : **10/720,308** Confirmation No. 4719  
**Applicant** : Y. KANEDA et al  
**Filed** : November 25, 2003  
**Title** : DATA STORAGE SYSTEM, DATA STORAGE APPARATUS, COMPUTERS AND PROGRAMS  
**TC/AU** : 2131  
**Examiner** : TBD  
**Docket No.** : H-1121  
**Customer No.** : 24956

**PETITION TO MAKE SPECIAL**  
**UNDER 37 CFR §1.102(d) (MPEP §708.02(VIII))**

Commissioner for Patents  
P.O. Box 1450  
Alexandria, VA 22313-1450

Sir:

The Applicants petition the Commissioner to make the above-identified application special in accordance with 37 CFR §1.102(d). In support of this Petition, pursuant to MPEP § 708.02(VIII), Applicants state the following.

**(A) REQUIRED FEE**

This Petition is accompanied by the fee set forth in 37 CFR § 1.117(h). A Credit Card Payment Form in the amount of \$130 accompanies this Petition in satisfaction of the fee. The Commissioner is hereby authorized to charge any

additional payment due, or to credit any overpayment, to Deposit Account No. 50-1417.

**(B) ALL CLAIMS ARE DIRECTED TO A SINGLE INVENTION**

All the pending claims of the application, claims 1-13 are directed to a single invention. If the Office determines that all claims in the application are not directed to a single invention, Applicant will make election without traverse as a prerequisite to the grant of special status.

The claimed invention, as set forth in independent claims 1, and 7-13, is generally directed to a data storage system having the capability of efficiently providing a large number of volumes. As set forth in claim 1, the invention is a data storage system having a computer and a data storage apparatus that has a plurality of storage volumes for storing data to be accessed by the computer. The data storage apparatus includes a management unit for sending a response to the computer for recognizing a virtual drive unit capable of treating a storage volume that is non-removable as a removable storage medium. A storing unit is also included in the data storage apparatus for storing volume management information indicating the correspondent relationship between the virtual drive unit and the storage volume. The computer includes an interface for receiving the response, and a management unit for recognizing the virtual drive unit based on the response. The management unit of the data storage apparatus specifies the storage volume to be accessed

based on an access request from the computer to the virtual drive unit and the volume management information.

Additionally, as set forth in claim 7, the invention is a data storage apparatus having a plurality of storage volumes for storing data to be accessed by a computer. The apparatus includes a management unit for sending a response to the computer for recognizing a virtual drive unit capable of treating the storage volume that is non-removable as a removable storage medium. A storing unit is also included for storing volume management information indicating the correspondent relationship between the virtual drive unit and the storage volume. The management unit specifies the storage volume to be accessed based on the access request from the computer to the virtual drive unit and the volume management information.

Also, as set forth in claim 8, the invention is directed to a computer for accessing data stored in a plurality of storage volumes in a data storage apparatus. The computer includes an interface for receiving a response from the data storage apparatus for recognizing a virtual drive unit capable of treating the storage volume that is non-removable as a removable storage medium. A management unit recognizes the virtual drive unit based on the response.

Furthermore, as set forth in claim 9, the invention is directed to a connecting apparatus for managing the correspondent relationship between a computer and a data storage apparatus having a plurality of storage volumes of storing data to be accessed by the computer. The connecting apparatus includes a management unit for generating a response to the computer for recognizing a virtual drive unit capable

of treating a storage volume that is non-removable as a removable storage medium. A storing unit is included for storing volume management information indicating the correspondent relationships between the virtual drive unit and the storage volumes. The management unit specifies the storage volume to be accessed based on an access request from the computer to the virtual drive unit and the volume management information.

In addition, as set forth in claim 10, the invention is directed to a program for managing access to data stored in a plurality of storage volumes in a data storage apparatus. The program causes a computer to execute a function for receiving a response from the data storage apparatus for recognizing a virtual drive unit capable of treating a storage volume that is non-removable as a removable storage medium. The program also causes the computer to execute a function for recognizing, on the basis of the response, a virtual drive unit to which the storage volume that is non-removable is connected as a removable storage medium.

Additionally, as set forth in claim 11, the invention is directed to a program for managing access to data stored in a plurality of storage volumes in a data storage apparatus. The program causes a computer to execute a function for generating a response to the computer for recognizing a virtual drive unit capable of treating a storage volume that is non-removable as a removable storage medium. Also included are a function for storing volume management information indicating the correspondent relationship between the virtual drive unit and the storage volume, and a function for specifying the storage volume to be accessed based on an access

request from the computer to the virtual drive unit and the volume management information.

Furthermore, as set forth in claim 12, the invention is directed to a method for managing access to data stored in a plurality of storage volumes in a data storage apparatus. The method includes receiving a response from the data storage apparatus for recognizing a virtual drive unit capable of treating a storage volume that is non-removable as a removable storage medium. On the basis of this response, a virtual drive unit to which the storage volume that is non-removable is connected is recognized as a removable storage medium.

Finally, as set forth in claim 13, the invention is directed to a method for managing access to data stored in a plurality of storage volumes in a data storage apparatus. The method includes generating a response to a computer for recognizing a virtual drive unit capable of treating a storage volume that is non-removable as a removable storage medium. Volume management information is stored indicating the correspondent relationship between the virtual drive unit and the storage volume. The storage volume to be accessed is specified based on an access request from the computer to the virtual drive unit and the volume management information.

### **(C) PRE-EXAMINATION SEARCH**

A careful and thorough pre-examination search has been conducted, directed to the invention as claimed. The pre-examination search was conducted in the following *US Manual of Classification* areas:

| <b><u>Class</u></b> | <b><u>Subclass</u></b> |
|---------------------|------------------------|
| 710                 | 72, 74                 |
| 711                 | 111, 112, 114, 202     |

Furthermore, a keyword search was conducted on the USPTO's EAST database. Additionally, a literature search was conducted for relevant non-patent documents using the DIALOG online databases. In addition, a search for foreign patent documents was conducted on the European Patent Office's ESPACENET databases.

### **(D) DOCUMENTS DEVELOPED BY THE PRE-EXAMINATION SEARCH**

Of the documents reviewed during the search, those deemed to be most closely related to the subject matter encompassed by the claims are listed below. These documents were made of record in the present application by the Information Disclosure Statement filed January 19, 2005.

| <b><u>Document No.</u></b> | <b><u>Inventor</u></b>      |
|----------------------------|-----------------------------|
| US 5963971                 | Fosler, Christine L. et al. |
| US 6304940                 | Beardsley, Brent Cameron    |
| US 20020069245             | Kim, Han-Gyoo               |
| US 20030204700             | Biessener, David W. et al.  |
| US 20030212859             | Ellis, Robert W. et al.     |

Additionally, the following document was made of record in the present application by the Information Disclosure Statement filed December 9, 2003.

**Publication**

Baker, Art, "The Windows NT Device Driver Book", 1997, pp. 62-71

Because all of the above-listed documents are already of record in the present application, in accordance with MPEP § 708.02(VIII)(D), additional copies of these documents have not been submitted with this Petition.

**(E) DETAILED DISCUSSION OF THE REFERENCES**

A discussion of each the above-listed documents is set forth below, pointing out, with the particularity required by 37 CFR 1.111 (b) and (c), how the claimed subject matter is patentable over the teachings of the above-listed documents.

The patent to Fosler, US 5963971, shows a data storage subsystem in which a virtual removable media server handles host audit requests, regardless of whether the requests are directed to a physical volume or a virtual volume physically stored in cache or in a removable physical media item. (See, e.g., Abstract and column 2, line 19, through column 3, line 11.) Thus, Fosler teaches the use of a system which emulates a removable media server, unlike the present invention, wherein a management unit sends a response to a computer for recognizing a virtual drive unit capable of treating a storage volume that is non-removable as a removable storage media, as set forth in claims 1 and 7-13. Additionally, Fosler does not teach a managing unit that specifies a storage volume to be accessed based on an access request from a computer to a virtual drive unit and volume management information,

as set forth in claims 1, 7, 9, 11, and 13. Accordingly, claims 1 and 7-13 are patentable over Fosler.

The patent to Beardsley, US 6304940, shows a direct access data storage system in which records are mapped into fixed block architecture (FBA) data records so as to appear to an FBA controller and an AIX host as a removable media having a preset directory. The appearance to an AIX host as a device having a preset directory simplifies and speeds the operation of the AIX host. (See, e.g., Abstract and column 6, lines 35-46.) Thus, while Beardsley utilizes a fixed disk storage as a removable media, Beardsley does not teach the present invention, wherein a management unit in the data storage apparatus sends a response to a computer for recognizing a virtual drive unit capable of treating a storage volume that is non-removable as a removable storage medium, as set forth in claims 1, and 7-13. Additionally, Beardsley does not teach a managing unit that specifies a storage volume to be accessed based on an access request from a computer to a virtual drive unit and volume management information, as set forth in claims 1, 7, 9, 11, and 13. Accordingly, claims 1 and 7-13 are patentable over Beardsley.

The published US patent application to Kim, US 20020069245, shows a network-attached disk (NAD) system in which a host computer is connected via a network to the NAD. The NAD is treated as a local disk capable of dynamic addition or removal. (See, e.g., Abstract and paragraphs [0012], {0069}-[0095].) Thus, Kim



does not teach the present invention, wherein a response is sent to a computer by a data storage apparatus for recognizing a virtual drive unit capable of treating a storage volume that is non-removable as a removable storage medium, as set forth in claims 1 and 7-13. Additionally, Kim does not teach a managing unit that specifies a storage volume to be accessed based on an access request from a computer to a virtual drive unit and volume management information, as set forth in claims 1, 7, 9, 11, and 13. Accordingly, claims 1 and 7-13 are patentable over Kim.

The published US patent application to Biessener, US 20030204700, shows a storage system having one or more physical storage devices and a controller which maintains a virtual physical drive map, and maps the virtual physical drives (VPDs) to storage media of the physical storage devices. A user may define an arbitrary number of VPDs, but since only two VPDs may be online at a given time, the user may define a single boot VPD, and configure the other VPDs as removable drives. (See, e.g., Abstract and paragraphs [0067]-[0073].) Thus, in Biessener, the user configures the virtual drives as removable drives, whereas in the present invention, a management unit of a storage apparatus sends a response to a computer for recognizing a virtual drive unit capable of treating a storage volume that is non-removable as a removable storage medium, as set forth in claims 1 and 7-13. Additionally, Biessener does not teach a managing unit that specifies a storage volume to be accessed based on an access request from a computer to a virtual

drive unit and volume management information, as set forth in claims 1, 7, 9, 11, and 13. Accordingly, claims 1 and 7-13 are patentable over Biessener.

The published US patent application to Ellis, US 20030212859, shows a storage system controller that includes a plurality of a media controllers, with each media controller having a storage media coupled thereto. The minimum configuration is one media controller used alone so as to make a normally fixed storage media appear as a removable storage media. (See, e.g., Abstract and paragraphs [0041]-[0042].) However, Ellis does not teach the present invention, in which a response is sent to a computer by a data storage apparatus for recognizing a virtual drive unit capable of treating a storage volume that is non-removable as a removable storage medium, as set forth in claims 1 and 7-13. Additionally, Ellis does not teach a managing unit that specifies a storage volume to be accessed based on an access request from a computer to a virtual drive unit and volume management information, as set forth in claims 1, 7, 9, 11, and 13. Accordingly, claims 1 and 7-13 are patentable over Ellis.

The publication to Baker, "The Windows NT Device Driver Book", provides a general discussion of I/O request packets, driver objects, device objects, and device extensions. Accordingly, Baker is of only general interest to the present invention as background information, and is discussed herein only because it is of record in the case. Thus, Baker does not teach or suggest a response being sent to a computer

by a data storage apparatus for recognizing a virtual drive unit capable of treating a storage volume that is non-removable as a removable storage medium, as set forth in claims 1 and 7-13, and, accordingly, these claims are patentable over Baker.

### **CONCLUSION**

The Applicants submit that the foregoing discussion demonstrates the patentability of independent claims 1 and 7-13 over the closest-known prior art, taken either singly, or in combination. The remaining claims, claims 2-6, depend from claim 1, claim additional features of the invention, and are patentable at least because they depend from an allowable base claim. Accordingly, the requirements of 37 CFR §1.102(d) having been satisfied, the Applicants request that this Petition to Make Special be granted and that the application be examined according to prescribed procedures set forth in MPEP §708.02 (VIII).

The Applicants prepared this Petition in order to satisfy the requirements of 37 C.F.R. §1.102(d) and MPEP §708.02 (VIII). The pre-examination search required by these sections was "directed to the invention as claimed in the application for which special status is requested." MPEP §708.02 (VIII). The search performed in support of this Petition is believed to be in full compliance with the requirements of MPEP §708.02 (VIII); however, Applicants make no representation that the search covered every conceivable search area that might contain relevant prior art. It is always possible that prior art of greater relevance to the claims may exist. The Applicants urge the Examiner to conduct his or her own complete search of the prior art, and to

thoroughly examine this application in view of the prior art cited above and any other prior art that may be located by the Examiner's independent search.

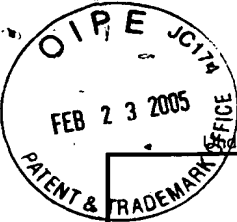
Further, while the Applicants have identified and discussed certain portions of each cited reference in order to satisfy the requirement for a "detailed discussion of the references, which discussion points out, with the particularly required by 37 C.F.R. §1.111(b) and (c), how the claimed subject matter is patentable over the references" (MPEP §708.02(VIII)), the Examiner should not limit review of these documents to the identified portions, but rather is urged to review and consider the entirety of each reference.

Respectfully submitted,



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Date: February 23, 2005



Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

|   |                               |                          |
|---|-------------------------------|--------------------------|
| <b>PETITION FEE</b><br>Under 37 CFR 1.17(f), (g) & (h)<br><b>TRANSMITTAL</b><br>(Fees are subject to annual revision)<br><br><b>Send completed form to: Commissioner for Patents</b><br><b>P.O. Box 1450, Alexandria, VA 22313-1450</b> | <b>Application Number</b>     | <b>10/720,308</b>        |
|   | <b>Filing Date</b>            | <b>November 25, 2003</b> |
|   | <b>First Named Inventor</b>   | <b>Y. KANEDA et al</b>   |
|   | <b>Art Unit</b>               | <b>2131</b>              |
|   | <b>Examiner Name</b>          | <b>TBD</b>               |
|   | <b>Attorney Docket Number</b> | <b>H-1121</b>            |

Enclosed is a petition filed under 37 CFR 1.102(d) that requires a processing fee (37 CFR 1.17(f), (g), or (h)). Payment of \$ 130.00 is enclosed.

This form should be included with the above-mentioned petition and faxed or mailed to the Office using the appropriate Mail Stop (e.g., Mail Stop Petition), if applicable. For transmittal of processing fees under 37 CFR 1.17(i), see form PTO/SB/17i.

**Payment of Fees** (small entity amounts are NOT available for the petition (fees))

☒ The Commissioner is hereby authorized to charge the following fees to Deposit Account No. 50-1417:

☐ petition fee under 37 CFR 1.17(f), (g) or (h)      ☒ any deficiency of fees and credit of any overpayments

Enclose a duplicative copy of this form for fee processing.

☐ Check in the amount of \$ \_\_\_\_\_ is enclosed.

☒ Payment by credit card (From PTO-2038 or equivalent enclosed). Do not provide credit card information on this form.

|   |                  |                      |
|---|------------------|----------------------|
| <b>Petition Fees under 37 CFR 1.17(f):</b>  | <b>Fee \$400</b> | <b>Fee Code 1462</b> |
| For petitions filed under:<br>§ 1.53(e) - to accord a filing date.<br>§ 1.57(a) - to according a filing date.<br>§ 1.182 - for decision on a question not specifically provided for.<br>§ 1.183 - to suspend the rules.<br>§ 1.378(e) for reconsideration of decision on petition refusing to accept delayed payment of maintenance fee in an expired patent.<br>§ 1.741(b) - to accord a filing date to an application under §1.740 for extension of a patent term.  |                  |                      |
| <b>Petition Fees under 37 CFR 1.17(g):</b>  | <b>Fee \$200</b> | <b>Fee code 1463</b> |
| For petitions filed under:<br>§1.12 - for access to an assignment record.<br>§1.14 - for access to an application.<br>§1.47 - for filing by other than all the inventors or a person not the inventor.<br>§1.59 - for expungement of information.<br>§1.103(a) - to suspend action in an application.<br>§1.136(b) - for review of a request for extension of time when the provisions of section 1.136(a) are not available.<br>§1.295 - for review of refusal to publish a statutory invention registration.<br>§1.296 - to withdraw a request for publication of a statutory invention registration filed on or after the date the notice of intent to publish issued.<br>§1.377 - for review of decision refusing to accept and record payment of a maintenance fee filed prior to expiration of a patent.<br>§1.550(c) - for patent owner requests for extension of time in <u>ex parte</u> reexamination proceedings.<br>§1.956 - for patent owner requests for extension of time in <u>inter partes</u> reexamination proceedings.<br>§ 5.12 - for expedited handling of a foreign filing license.<br>§ 5.15 - for changing the scope of a license.<br>§ 5.25 - for retroactive license. |                  |                      |
| <b>Petition Fees under 37 CFR 1.17(h):</b>  | <b>Fee \$130</b> | <b>Fee Code 1464</b> |
| For petitions filed under:<br>§1.19(g) - to request documents in a form other than that provided in this part.<br>§1.84 - for accepting color drawings or photographs.<br>§1.91 - for entry of a model or exhibit.<br>§1.102(d) - to make an application special.<br>§1.138(c) - to expressly abandon an application to avoid publication.<br>§1.313 - to withdraw an application from issue.<br>§1.314 - to defer issuance of a patent.  |                  |                      |

|                          |                         |  |                          |
|--------------------------|-------------------------|--|--------------------------|
| <b>Name (Print/Type)</b> | <b>Colin D. Barnitz</b> | <b>Registration No. (Attorney/Agent)</b> | <b>35,061</b>            |
| <b>Signature</b>         |                         | <b>Date</b>                              | <b>February 23, 2005</b> |

This collection of information is required by 37 CFR 1.114. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.